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FISH TECHNOLOGICAL EXPERIMENT STATION
C.F.T.R.I.
MANGALORE.

INDIGENOUS MARINE FISHING GEAR AND METHODS OF INDIA-PART-I KARNATAKA STATE

Central Institute of Fisheries Technology
(Indian Council of Agricultural Research)
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KERALA, INDIA

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INDIGENOUS MARINE FISHING GEAR AND METHODS OF INDIA-PART-1

KARNATAKA STATE

Prepared by

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Central Institute of Fisheries Technology

(Indian Council of Agricultural Research)

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KERALA, INDIA

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FOREWORD

As a result of the efforts of Shri. V. C. George, Scientist S-2 of the Institute, it was possible to bring out a Special Bulletin earlier on the 'Inland Fishing Gear and Methods of India' which threw light on the general characteristics of some of the important types of inland fishing gear of the country. The need was felt subsequently to bring out bulletins in series on the indigenous marine fishing gear and methods specific to the different maritime States of India. As a first step towards achieving this goal, a comprehensive study was undertaken with respect to Karnataka Coast. Shri. George has done a commendable job in this aspect and he presents herein an illustrated account of the different indigenous marine fishing gear in vogue in different centres of the State. This is a necessary step for understanding the existing gear and also for improving the same. It is hoped that the research workers in fishing gear will make use of the information presented herein.

Cochin-29
2nd February 1981

DIRECTOR
C. I. F. T.

Indigenous Marine Fishing Gear & Methods of India

PART-1 KARNATAKA STATE

V. C. GEORGE

Introduction:

Karnataka State has a coast line of nearly 300 kms. extending from Mangalore to Karwar. The average annual fish production of this Coast is 60,000 tons (this figure is exclusive of the trawler catches) being about 8% of the total marine landings of the country as a whole (Anon 1969). In the fisheries atlas, the Coast is often designated as the "Mackerel Coast" as mackerel is an important fishery of the area and *RAMPON* or *RAMPINI,* a shore seine, constitute the principal fishing gear (Anon 1958.)

Hornell (1938) described some of the fishing methods of South Kanara, while those of North Kanara were covered in the account by Sorley (1948). Bhimachar (1942) in his report included some of the inland fishing implements. Brief account of the mackerel fishing gear of this Coast has been given by Pradhan (1956), on longline gear by John (1946) and on crab fishing by George (1961). Excepting for these few descriptive accounts, no detailed account incorporating all technological aspects of the fishing gear has been published so far. It is hoped that the present communication will bridge the gap.

The information furnished is based on the personal observation of the author at different centres of the State, Text. Fig. 1. Table I shows the details of different gears surveyed. The classification followed is that of Brandt (1958, 1964).

1. WOUNDING GEAR

1. i. Hand harpoon or *ULI* is the simplest form.

However the implement is no more used as an independent fishing gear, but only as an ancilliary equipment in long lining. The harpoon consists of the spear proper fixed on one end of a handle, *DENDU,* which is of light wood. The free end of the spear ends in a backwardly directed sharp barb, while at the opposite end is a socket closely fitting the wooden handle. Hard twisted coir rope serves as the retrieving line. The line is split into four and is fixed to four eyelets at the base of the spear. When

the harpoon is set, the retrieving line is coiled over the *DENDU;* the line then has a length of 10 to 15 m.

When the fish is harpooned, the spear penetrates the body of the victim and the wooden handle disengages itself from the spear. The handle floats and this helps the fishermen to secure the victim by holding the shaft and rope in turn.

When live fishes, especially sharks, are caught in long lines, they are harpooned to death to minimise the hazards in the hauling-in operation.

2. LINES

2.i *Pole and line* is not practised on a commercial basis, but only for the daily fish requirement of the individual. The gear consists of the pole, usually of palmyra palm (*Caryota urenes*), 2 to 2.5 m in length, to the distal end of which is attached the monofilament line 10-12m in length. Towards the free end of the line is the snood weighted with a lead sinker followed by the hook. The hook size ranges from Nos. 10 to 14 and are of round bent type.

These lines are operated at any time of the day from shore or from small dug-out canoes called *PATHI*. The baits used are prawn, very small fish and earthworms. The catch consists of perches, *Sciaenids* and small cat fishes.

2.ii *Throw line*: It is a modification of the pole and line. In this gear the length of the line is more being 80 to 100 m. The material of the line is monofilament 1 to 1.5 m in diameter. The snood is weighted with lead sinker and ends in one or two hooks of size, Nos 10 to 14 as in Fig. 2. The bait used are crab meat, prawn and viscera of fishes.

The line is cast from shore after baiting the hooks. The bulk of the line is held in the left hand and a few metres of the line with the snood in the right hand. That portion of the line in the right hand is whirled vigorously and on gaining the required momentum the line is released followed by the line in the left hand. The lines thus cast remain in the region of the brakers and an occasional pull is given to keep the line taut. Throw line fishing is conducted during high tide, when fishes are said to frequent the shore. The species caught are *Sciaenids,* perches and small cat fishes.

2.iii *Drift line*: It is also a modification of the pole and line. The main line, which is very short, is fixed to a float on the one end and the other to the snood ending in a hook. The details of the gear are given in Fig. 3. The length of the main line is adjusted in such a way that the hook will be just touching the bottom. The excess length of line is wound on the float and fixed firmly. The floats are usually long and the line is fixed on one end of the float so that when any fish hooks, the line is

pulled downwards and the floats take a vertical position giving indication to the men on the shore. The hooks used are round bent type of size No: 10 to 14. The bait used are prawn, very small fish and earthworms.

2.iv. *Set long lines*: *BALIYA BEPPU* — This is the set long line for sharks. The main line *ADI NOOL* or *DHORI* is made into convenient sections or baskets, *POTALI* or *VALAPPU*, the length of each section ranging from 60 to 180m. The snoods *CHATTU NOOL* are fixed at intervals of 5-20m and the length of each snood varies from 0.3m to 1.2 m. Hooks are of the size No 1 and 01 or large country made ones. Table II gives the details of *BALIYA BEPPU.*

The material used for the main line and snoods are cotton twine, hard twisted Ne 10|20|3 to 10|35|3. In the case of lines with No 01 and other large country made hooks the cotton snood is replaced by revolving chain snoods. The float and sinker line *CHAKKU NOOL* is 1 to 1.25 times the depth of the ground.

Bait used vary during the course of the season. For No. 1 hooks, pieces of mackerel are used from August to December and pieces of eel from January to May. It is reported that during the latter period mackerel baits are usually eaten by small fishes, hence this change to eel. Sardines are also used when the other two baits are not available. Cut pieces of seer, cat fish, porpoise and whole mackerel are used as bait with No. 01 and large country made hooks.

The fishing season is from September to May with the peak from January to March. The depth of the ground ranges from 18 to 45 m. The craft used is *BEPPU TONY* - a dug-out canoe 8 to 9.9m. long manned by a crew of 4 to 6. From each boat, either 350 to 600 hooks of No. 1 or 35 to 100 hooks of No. 01 are operated.

The boats reach the ground in the evening and the lines are set overnight. The use of chain snoods is on the decline as there is a popular belief that they can cause scaring sounds.

2.v. *Drift long line*: *NERIYA BEPPU* are operated for small sharks and cat fishes. The material used for main line is cotton of specification Ne 10 20 3; Ne 20 24 3 or Ne 20 30 3. The snoods are fixed to the main line at intervals of 2.75 to 5.0 m. The size of the hook used ranges from Nos 4 to 6 and about 600 to 1500 hooks are operated from one boat. The details of *NERIYA BEPPU* are given in Table III.

The fishing season extends from September to April. The bait used are mainly prawn and cut pieces of squid. Occasionally, pieces of sardine or mackerel are also used. Fishing with *NERIYA BEPPU* is conducted during day time. Boats reach the ground early in the morning and

return in the evening. Other details are same as for set long line. The catch consists of small sharks, cat fishes and sometimes seer.

3. SEINE NETS

Three groups of nets are found under this class; they are Double stick nets, Shore seines and Boat seines. The general characteristics of Double stick nets and Shore Seines are given in Tables IV & V.

3.1 *Double stick net*: *GORU BALA* of Harwada, Fig. 4, belong to this category. This is a very small net less than five metres in length with two poles on either side. The webbing of the net is made by joining panels of webbing one above the other from head rope to foot rope. The mesh size of the net is 4 mm bar. During the course of operation, two men wade in water with the net held between them. The net is operated in small creeks and other sheltered areas along the shore.

3.2 *Shore Seine*: Under the shore seines are included three sizes of nets. the *PAYODA* which is small, the *KAIRAMPINI* which is of medium size and *RAMPINI* the largest shore seine. All the shore seines are symmetrical.

3.2i. *PAYODA* This is the smallest shore seine of the coast. The webbing of the net consists of series of panels extending along the entire depth. The mesh size of the net ranges from 7.5 to 15 mm bar. The foot rope is slightly shorter than the head rope.

Floats are root of *BENDAE* as shown in Fig. 10.14; the sinkers are lead rings directly passed on the foot rope. At the two ends of the net there is the spreader or *DENDU*.

PAYODA is operated by two men wading in water. The net is operated in a semicircular fashion. The catch consists of all sorts of small fishes. A typical *PAYODA* operated at Majali is shown in Fig. 5.

3.2.ii *KAIRAMPINI*: It is a medium size shore seine with distinct sections within the body of the net. Thus there are two outer wings, the *ALLI BALA* or *DODDA BALA* one on either side, the two inner wings, the *CHIKKA BALA* or *THIKKA BALA* and the middle landing part *MAUND*.

Each region of the net is made up of a series of panels. The construction details, mode of operation etc. are identical to that of *RAMPINI* and will be described in detail under that head.

The *KAIRAMPINI* is operated as an independent gear or as an ancilliary one to *RAMPINI*. *KAIRAMPINI* of Bockapatna (Table. VI) is of 173.05 m length along the head rope. The season for the operation of the net is from March to October, and the catches are mainly sardines,

mackerels, small *Sciaenids*, prawns and soles. *KAIRAMPINI* of Malpe is of 313.02 m along the head rope. It is operated from May to October and the catches are same as of Bockapatna. The net is also operated as an ancilliary during the operation of *RAMPINI*.

3.2.iii. *RAMPINI*: This is the largest shore seine of the coast said to have been introduced by Rev. Fr. Rampon, a Portuguese priest in Goa, but this is under dispute as will be seen later. The diagrammatic arrangement of the net is given in Figs. 6A & B.

In the construction of the net, the mesh size decreases from outer wing towards the central landing part, while the thickness of the twine increases from the outer wing towards the central landing part. The ratio of diameter of twine to mesh bar (d|a) is 0.072 to 0.079 at the landing part, 0.04 to 0.05 at the inner wing and 0.027 to 0.028 at the outer wing. The Coefficient of hanging decreases from outer wing towards the landing part (0.42 to 0.33), while the hung depth increases progressively from the outer wing to the landing part (5.75m to 16.83 m). The hung depth of webbing at the landing part is about 1½ times the depth of the fishing ground. The wing constitutes 90 to 95% of the total length of the net.

The different sections of the net constituting different regions of the *RAMPINI* are joined by reef knot along the head and foot ropes, while webbing of adjacent pieces are joined by lacing. Thus the net in the final stage consists of a series of sections joined together. Further, the size of the net is increased or decreased by adding or removing sections as and when required. Usually, in a net, about 1|3 of the total webbing will be old and the rest new.

In the middle of *MAUND*, a large float, *VYRABI*, is fixed by a long rope. During operation, this float serves to indicate the middle point of net. The sinkers are pieces of stones fixed at regular intervals on the foot rope. At the lower end of *DENDU*, a stone depressor is fixed as in Fig. 6-B.

The boats used for fishing operations are *PANDHI*, a large outrigger canoe 15-16 m L.O.A. manned by a crew of 20. In addition to this, two to three small boats, *KOLTONY*, are employed as pilot boats for locating shoals.

The *RAMPINI* is stalked in the midship of *PANDI* in the order of outerwing, innerwing, landing part, innerwing and outerwing. The warps are kept in the aft. During the season, pilot boats are employed to survey the fishing ground for detection of fish shoals and only after ascertaining from them details regarding the abundance and location of the shoal, the net is set. The net is payed in the form of 'C', the two

short arms of 'C' being formed by warps. During the course of operation, the warp is payed perpendicular to the shore. The warp payed is collected by one man from shore. When the warp of one side is completed, the net is payed and at this time the boat moves parallel to the shore. As the net is completely payed, the boat turns towards the shore in a perpendicular direction paying the warp, and when the warp is over and the *PANDI* reach the shore, the warp end is handed over to the party on the shore and the hauling in starts. After this the *PANDI* return with two or three men and take up a position near the *VYRABI*. The pilot boats also take their position along the outer periphery of the net. During the course of operation, both the ends of the net come close together reducing the area within the net. Towards the final stage of operation, *KAIRAMPINI* is operated 3 to 5 times inside the area enclosed by *RAMPINI,* and bulk of the catch removed. After every operation of *KAIRAMPINI,* the *RAMPINI* is dragged further shorewards decreasing the area covered. At the final stage, the *RAMPINI* itself is hauled up by suddenly lifting the foot rope and holding it with the head rope.

When immediate marketing facilities are not available or when the operation is not completed by evening, the net along with fish is kept in impounded position. The head rope and foot rope at both ends are fixed to ropes in turn attached to pegs driven on the shore. Heavy stones are fixed along the foot rope of the net. Further, bamboo or wooden poles are fixed along the periphery of the net and the head rope is supported by these poles. Large meshed net of coir yarn is fixed on the outer side of *RAMPINI* to prevent any possible attack by sharks and porpoises. The fish can remain in this position for 2 to 3 days even though there is considerable loss due to mortality. When the net is to be hauled again, all the extra structures are removed.

The catch in the net consists of mainly mackerel and towards the close of the season pomfrets are also obtained. Even though sardines are obtained it is not economical to operate the gear for that fish alone.

During the process of hauling in, the hauled-in warp and nets are removed section-wise, dried and if need be, repaired.

RAMPINI of Tarapathy is 1458 m in length along the head rope. The hung depth of the net ranges from 5.8 metres at the *ALLI BALA* to 13.8 metres at the *MAUND*. Season for operation of this net is from October to March. *RAMPINI* of Binga (Table VII) is 3914.86 m long. The hung depth of the net ranges from 5.75 m at the *ALLI BALA* to 16.83m. at the *MAUND*.

3.2.iv *Two boat seines*: The *MARI BALA* (Fig. 7) or *GOL BALA* (Fig. 8) operated for cat fishes and *Sciaenids* and the *CHIKKAE BALA* (Fig. 9) operated for small miscellaneous fishes fall under this group.

These are typical boat seines consisting of the bag *BALA*, the wing and platform *THATTU* or *JOT* and the warp *KAMBA* or *ASARA*.

The *BALA* consists of 6 to 9 circular bands, *CHUTTU* or *KARVI*, which in turn consists of a fixed number of square webbings. The number of these square webbings increases from the cod end towards the mouth of the bag. The first band is rectangular; in the second band, corresponding to the four corners of the first band, there are four triangular pieces, *THELU*. These pieces are inserted to give the required shape to the bag of the net. The periphery of the mouth of the bag is strengthened by two rows of selvage meshes. The head rope of the bag is fixed to 1/4th the circumference of the mouth of the bag.

For convenience in handling, the bag is fabricated in two halves and they are laced, joined along the upper and lower median line.

The wings and platform are also made in two halves, each half being joined along the middle of the platform. The posterior part of the wing forms the side walls along the region of the platform. The platform is rectangular with uniform mesh size and the meshes are comparatively smaller than the wings of the adjacent sides. At one end, the platform is joined to the bag and at the opposite end there is a rope which serves as the foot rope of the platform. At the lateral sides of the platform, the wings are joined. A wing consists of 3-4 sections. The head rope of the bag is joined to the head rope of the wing. Similarly the foot rope of the platform is joined to the foot rope of the wing. The wings and platform are joined to the bag by lacing the end meshes of wings and platform to the outer selvage meshes of the bag.

The warps are of coir attached to the free end of the wings. The length of the warp ranges from 9-12 metres. The general characteristics of *MARI BALA* are given in Table VIII

Scaring device known as *GUNTU* is used during the operation to drive the fish into the net. This is a granite stone 5 to 6 kg in weight attached to a rope 10-15 metres in length.

The net is operated from September to February in depth ranges of 9 to 16 m, usually during day time. *GOL* (*Sciaena sina*) forms the main catch during September to November and cat fishes during the remaining period.

Two *MARI BALA TONY* and one or two scout boats are required for the operation of the net. The scout boats leave for the ground by early morning and *MARI BALA TONY* later. The net is carried in both the *TONY*. When shoals are sighted, the pilot boat gives signals to the crew in the *MARI BALA TONY* and the *TONY* moves to the particular area. During this time, the bag is joined to the wing and platform and the

net is made ready for operation. At the initial stage, the boats move outwards and then parallel. This is done so as to give the maximum spread to the net and thereby enclose the shoals. The net is payed in the order of bag, wings and platform and warp. After paying the warps, the boats drive the shoal into the net by repeated throw of the scare line.

Hauling is done very quickly and their first attempt is to confine the fish in the bag of the net. As the warps are hauled, the two boats come close together and this is followed by the wings and platform. When the platform is lifted, the entire head rope of the net is also hauled confining the catch to the bag of the net. Prior to removing the catch from the net, especially in the case of cat fishes, they are stopped from struggling by cutting open the operculum of one or two fishes and pouring the blood onto the catch. The catch is collected in the pilot boats.

For successful operation, it is said that the platform of the net should be just under the shoal preferably facing the direction of movement. When the net is operated for '*ghol*' the buoy rope is released in full and for cat fishes, only part of it.

Successful operation may yield 600 to 1000 cat fishes per operation and two to three operations are conducted per day. Sometimes, shoals of pomfrets and rays are also caught in the net.

MARI BALA of Ullal (Fig. 7) has seven circular bands in the bag and four sections in the wing. The season for this net is from September to February.

GOL BALA of Kumta (Fig. 8) has eight circular bands in the bag. The foot rope is confined to the platform only. Season is from August to November.

CHIKKAE BALA of Karwar (Fig. 9) has very limited distribution being found at Karwar only. The net is identical to the *MARI BALA* in construction and operation. Large wooden floats used in *MARI BALA* are absent, so also pilot boats are not employed. The season is from August to September and the depth of operation ranges from 5 to 9 metres. Catches are miscellaneous varieties of fish.

4. SURROUNDING NETS

4.1. *Totally Encircling Nets*: *PATTA BALA*, employed for mackerel, belongs to this group. The principle is to encircle a detected shoal by net from one or more boats, the nets extending from the surface to the bottom of the ground. The details of *PATTA BALA* at various centres are given in Table-IX. The nets are operated from boats known as *PATTA BALA TONY* manned by a crew of 5 to 8.

The material of the webbing is generally cotton, while hemp is also used as at Kumta. The mesh size ranges from 25 mm to 30 mm bar. In the upper side there may be one or two rows of selvage. The head rope consists of two ropes, the head rope proper and the mounting rope. The coefficient of hanging ranges from 0.36 to 0.57 and the hung depth from 6.8 to 13.2 metres. The floats used are pieces of wood, either trunk or root (Fig. 10.1-4). The sinkers are granite stones of irregular shape except at Kumta where the sinkers are specially shaped as in Fig. 10.18.

PATTA BALA fishing is done during early morning. One or two pilot boats are used by each group of boats for locating the shoal. The pilot boats loaded with stones reach the ground early to locate the shoal. On receipt of a signal from the pilot boat regarding the location of the shoal, the *PATTA BALA TONY* moves towards the area. In the meantime, the nets of each boat are made ready for operation. All the boats of the group take their position surrounding the shoal. On a given signal the net of each boat is payed in the form of an arc. Thus, when the nets of all boats are payed, the shoal is completely encircled and the boats take their position at the junction of nets of two boats. The encircled shoal is scared either by beating on the sides of the boat or on the surface of water or by throwing stones kept in the pilot boats. The number of operations range from 2 to 6 per day. When two boats jointly operate, then each boat takes a semicircular course, thereby completely enclosing the shoal. At Ullal, Bockapatna and Malpe, two boats jointly operate the net, while at Harwada and Majali, 3 to 5 boats jointly operate the net. At Majali, simetimes one boat itself operates the net in an encircling manner. The net is also operated in deeper waters exceeding the fishing height of the net by attaching buoys on long ropes from the head rope. At Gangoli, a small meshed net known as *MATU BALA* is operated for sardines and small mackerels along with *PATTA BALA*.

5. FALLING NETS

Hand cast nets are common all along the Karnataka Coast especially in North Kanara District. Two types of hand cast nets are prevalent in the area. They are a) Nets with closing strings and without peripheral pockets, and b) Nets without closing strings and with peripheral pockets.

5.1 Nets with closing strings and without peripheral pockets are the common types of cast nets of the coast. These nets can be divided into two groups, namely those operated from shore and those operated from boats, the latter being larger in size. *BEESU BALA* of Kumta and *PAG* of Majali belong to the first group. *EDACHI BALA* and *BEESU BALA* of Kumta, and *PAG* of Harwada belong to the second group.

5.2 Nets without closing strings and with peripheral pocket. These nets are generally operated from shore and are small in size. The *SHENDE BALA* of Majali and *PAG* of Karwar come under this group.

All the cast nets have the same general design as seen from Table-X. In those nets with peripheral pockets the main webbing is folded inwards and fixed to the body of the net at regular intervals forming pockets. The top end of the webbing is fixed to a hollow metal or bone ring on which is fixed the hauling rope. In nets with closing strings, the closing string passes through the ring at the top and each string divides into three before being attached to the peripheral string. The number of closing strings ranges from 10 to 21.

The large nets are operated from April to October while small nets are operated as and when required. The craft used are medium sized boats manned by a crew of 3 to 6, 4 to 5 being common.

In *PAG* of Karwar and *BEESU BALA* of Polippu, mackerels are caught. But the main catch from cast nets are sardines, soles, lactarius, prawns and other miscellaneous varieties of fishes.

6. GILL NETS

6.1 *Drift net for Seer*: *BEEDU BALA* has wide distribution all along the coast. These are surface drift gill nets operated during night time. The nets are made of hemp with mesh size ranging from 27 to 64 mm bar. The webbing is directly hung on the ropes, there being no selvage. The details of net at various centres are given in Table XI.

The webbing is fixed to the head rope and foot rope directly and at these points the floats or sinkers are fixed. The bars of the meshes at these regions are doubled. This doubling of bars may be done all along the four bars as at Harwada and Binga (Fig. 10.8 & 9) or confined to the upper two bars as at Polippu and Muradeshwar (Fig. 10.5). Trebbling of bars is noticed at Malpe, Gangoli and Tarapathy (Fig. 10.7). The webbing is treated with lime prior to mounting and later with bark extract.

Season for seer is from September and extends up to end of January. This is followed by pomfret, silver bar. tunny and sail fish. The best season is from October to November. The depth of ground ranges from 9 to 31 metres.

The nets are operated either from dug-out canoes or outrigger canoes. As a rule, the net is operated during night; but at Polippu, the nets are operated during day time also. Usually, the net is hauled twice, once at

midnight and the second time during the early hours of the day. If three hauls are made, the first haul is made by 9 p.m., second by midnight and third by early morning. The boats return to shore by morning. *SANNA BEEDU BALA* is a small meshed *BEEDU BALA* operated at Muradeshwar very near to the shore. At Majali, a variation of seer drift gill net called *MANCHI VALA* is operated exclusively for pomfrets.

6.2 *Drift net for Engraulis*: *MANAGU BALA* of Ullal is a surface drift net. The net has got very limited distribution. Details of the net are given in Table XII.

6.3 *Drift net for white sardine*: *BOLINGER BALA* is found at Ullal and nearby places. The details of the net are given in Table XIII.

6.4 *Drift net for Gar fishes*: *KANDAI BALA* - The operation of this net is peculiar. Two men are required for the operation. The net is held by one man on the shore, while his companion wades in the sea, perpendicular to the shore holding one end of the net and paying it regularly. When the net is completely payed he returns to the shore. When fishes are gilled the net is hauled by pulling the shore end of the net. The net is operated during early morning. In Table XIV are given the details of the net.

6.5 *Drift nets for Sardine*: *CHALA BALA* of Ullal is a surface drift gill net operated for sardines and small mackerel. The *CHATBAIKE BALA* or *CHATBAIKE PATTA BALA* of Malpe and *MATTU BALA* of Gangoli are operated like totally encircling gill net. The details of the net are given in Table XV.

7. TANGLE NETS

7.1 *Single net wall*: *BUDI BALA* is the tangle net operated for rays, skates, sharks and perches.

As in seer gill nets, the webbing is directly hung on the head and foot rope. Other details of the gear at various centres are given in Table XVI. The floats are of various shapes as in Fig. 10.10-12. Fishing season is from June to October, the depth of ground ranging from 7 to 22 metres.

The nets are operated during night time as bottom set net. The position of net in water is marked by buoys. The boats, after setting the net, return in the evening. The nets are checked the next day morning. Depending on the catch the net is either set on the same ground or shifted.

In the *PATHERLAE BALA* of Ullal two pieces of net are joined together and set as independent fleets. In the *THORKAE BALA* of

Polippu, small fleets are set perpendicular to each other in the form of T as in Fig. 10.19. Four to five pieces are joined and set as independent fleets at Harwada and Majali, while all the pieces are joined and set as one fleet at Kumta.

KANATHA BALA is a tangle net operated for miscellaneous types of fishes, crab and prawn. The net has got limited distribution from Mangalore to Malpe. The mesh size of the net ranges from 25.4 to 27.9 mm bar. The details of the net are given in Table XVII.

MATERIAL USED FOR FISHING GEAR

Cotton twine count Ne 10, 20 and 40, hemp (*Crotalaria juncea*) twines of various thickness, coir twines and rope are the chief fishing gear materials. At present, synthetic yarns are also used extensively (Antony Raja 1969). The details of fishing gear materials are given in Table No. XVIII.

The hooks used for line gear are mainly imported, while large shark hooks are locally made.

Floats used are dry wooden pieces of various shape and size as in Fig. 10. The wood used are PONGARA or HONGARA (*Erythrina indica Lam*), THEMBAE or THENDAE (*Samadara indica Gartn*), EKKE (*Calotropis gigantea* R & Br) and KANAPPADA (*Sapium insigne Benth*). In addition to these wooden floats, sealed Kerosene oil tins and tin cans are used as floats in long line gear (Fig. 10.17) Sinkers used are granite stones, irregular in shape except at Kumta, where the stones are specially shaped.

FISHING GEAR PRESERVATIVES AND METHOD OF PRESERVATION.

Fruit of PANACHIKKA (*Diospyros sp.*) is exclusively used for long line gear. This preservative is applied once in a week. The method of preparation and treatment is as mentioned by Kuriyan *et al* (1961).

The extract from the bark of *MATHI* or *BANAPPU* (*Terminalis tomentosa* W & A) is applied to seine nets, cast nets, ray tangle nets and seer drift nets. Method of preparation and treatment has been described by Kuriyan *et al* (1961) *op.cit*. For *PATTA BALA* the tannin preservative is applied on the lower and upper margin of the net. *KANJI* (rice boiled water) is applied to the middle region at certain places.

The hemp webbing of seer drift net and ray tangle net are treated with lime before mounting in order to make it soft and pliable. For this purpose, the new webbing is boiled in water with alternate layers of lime

for about 1 to 3 hours. The webbing after this treatment is washed and dried. However, this process is not applied to the hemp bag of *MARI BALA* as it will alter the shape of the bag.

CERTAIN BELIEFS AND CONCEPTS OF FISHERMEN

As in the case of agriculture, there exist certain age old beliefs and practices regarding the presence and absence of fish. These concepts have considerably influenced the fishermen in adopting the tactics.

Regarding climatic conditions it is believed that chill wind and cold weather are two factors favourable for better catches in *KANDAI BALA*. Dark night and clear water are supposed to be factors favourable for seer drift nets. It is a common belief among fishermen that rays and skates are present in abundance near rocky patches and consequently the ray tangle nets are operated in such areas.

It is believed that cat fish schools can be detected from long distance by the presence of dark brown or orange brown patches on the surface.

Surface moving mackerel shoals are detected by black patches and boiling appearance on the water surface, whereas presence of bubbles associated with dull brown colour is attributed to mackerel shoal moving in deeper waters. Mackerels are believed to be scared by the brown colour of nets if tanned; hence *PATTA BALA* is not tanned. Mackerel fishing with *PATTA BALA* during night time is considered as sin by the fishermen.

When heavy catches are obtained, the boats loaded with fish return to shore with certain special sign called *Bavutti*. This consists of attaching a coloured cloth above the sail. This sign serves to inform in advance the heavy catch to those on the shore, especially to merchants and fish curing agents.

FISHING CRAFTS

Fishing crafts are dug-out canoes introduced from Malabar Coast and the outrigger canoes introduced from Ratnagiri (Ziener, 1958; Hornell 1920). The important boats are the *PATTA BALA TONY*, *MARIBALA TONY* - all dug-out canoes - and the plank built boats, *PANDI*. The broad dimension of these boats has been given along with the respective fishing gear.

DISCUSSION

The distribution of different fishing gear is almost uniform along the Mysore Coast as the two principal fishing gear, shore seines and gill nets (Anon 1970 A) are uniformly distributed. This uniform distribution

can be attributed to the uniform fishing condition of the area. The line gear (excluding set long line and drift long line) few gill nets and cast nets are the only gear native to this Coast (Hornell 1938). The rest of the gear are introduced from other areas. Anon (1970 A) has recorded *KOLLI BALA* and *PAITHU BALA* as boat seines employed for mackerel along the Karnataka Coast, which is erroneus.

Set lines and drift lines are introduced from Bombay Presidency (Hornell 1938 *loc Cit.* John 1946). This gear has identical design all along the Coast. *GORU BALA* is included under seine nets (Brandt 1964. Hornell 1938) but it will be appropriate to classify it as double stick-held seine net (George 1971). The *KAIRAMPINI* is a small edition of the *RAMPINI* net and the name itself is suggestive of this.

The *RAMPINI* net is said to have been introduced by Rev. Fr. Rampony in Goa (Hornell 1938, Pradhan 1958, Anon 1970 A). The net was subsequently introduced by fishermen from Goa who settled in South Kanara owing to political troubles in Portuguese India in 1895 (Thurston 1900). Anon 1958 considers that *RAMPINI* was introduced from Far Eastern Countries like Malaya, China and Japan to Goa, as, prior to World War II, new nets were brought to Goa by merchants from the above countries. Andreev (1962) has classified bagless beach seines as drag seines and incorporates the bagless condition to the relatively low catch, presence of surf and strong current which interfere with the entry of fishes into the bag of the seine and with the normal brailing procedure. But this does not hold true in the case of *RAMPINI* as none of the conditions mentioned are prevailing with respect to *RAMPINI*. Brandt (1964) considers that seine nets without bag have evolved from a net wall.

The boat seine *MARI BALA* was introduced from Malabar Coast (Anon 1951, 1958, Hornell 1938, Sorley 1948). The *VAKKU VALA*, *ETTA VALA* of Malabar,*JOT* net of Ratnagiri are identical to the *MARI BALA*. The *CHIKKAE BALA* of Karwar need be considered as a local edition of *MARI BALA*.

The *PATTA BALA* with its double head rope, mode of operation in a circular manner and scaring method by throwing stones are said to be introduced from Ratnagiri area. However, Hornell (1938) considers this as a local invention. The *CHALA VALA* of Narakkal (Satyanarayana *et al* 1962) is similar to *PATTA BALA*. The *BANGUDA JAL* of North Kanara is also an encircling gill net for mackerel but Anon (1951) has classified it as stationary net. The Hong Kong fishermen used encircling gill nets for croakers (Chu 1960). The encircling gill net for mackerel in Indonesia, *UNA PLA LANG*, is operated identical to the *PATTA BALA* with respect to mode of operation and also in scaring by beating on the sides of boat (Charernphol 1951). The encircling principle is used in

North West and North East Coast of Africa as well as in the Mediterranean and off the Coast of South Asia (Brandt 1964).

Seer drift nets, *BEEDU BALA*, are introduced from North (Ratnagiri) - (Hornell 1938) and this is identical to the *WAVRI* or *VAVDI* of Konkan Coast (Sorley 1948). The *BEEDU BALA* has its counterpart in the Malabar Coast *OZHUKKU VALA*. Ray tangle net - *THORKAE BALA* is also introduced from North (Ratnagiri). This net is identical to the *BUDICHI* or *WAGHUR JAL* of Konkan (Anon 1951, Sorley 1948). The *THIRUKKA VALAI* of Madras Coast (Thyagarajan *et al* 1962) is identical to the *THORKAE BALA*.

KANATHA BALA or *KANTHA BALA* is a tangle net. However, Anon (1970) has described it as similar to *AYILA CHALA VALA*. It is also described as a bottom drift net (Santharam Rai 1962). The description of *KANDA BALA* (Hornell 1938) actually relates to *KANATHA BALA*. The *BOLINGER BALA, MANAGU BALA* etc are gill nets of local importance only.

SUMMARY

The indigenous marine fishing gear and methods of Karnataka Coast are enumerated with relevant data on classification, construction and method of operation. Attempts have been made to compare it with fishing methods in other parts.

ACKNOWLEDGEMENTS

The author wishes to acknowledge his gratitude to late Shri G.K. Kuriyan, Director, Central Institute of Fisheries Technology, Cochin for the guidance received during the investigation. Thanks are also due to Shri. S. Gopalan Nayar, Scientist, for critically going through the manuscript. He is also thankful to Shri Anselm, Draughtsman and Shri Ibrahim, Head Draughtsman for making the tracing of the various drawings. He places on record the most valuable help received from the Director of Fisheries, Bangalore, Karnataka and the industry at different stages of investigation.

FIGURES

Fig : 1		The Fishing Centres.
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Fig : 7		Mari Bala.
Fig : 8		Gol Bala.
Fig : 9		Chikkae Bala.
Fig : 10		Floats and sinkers.

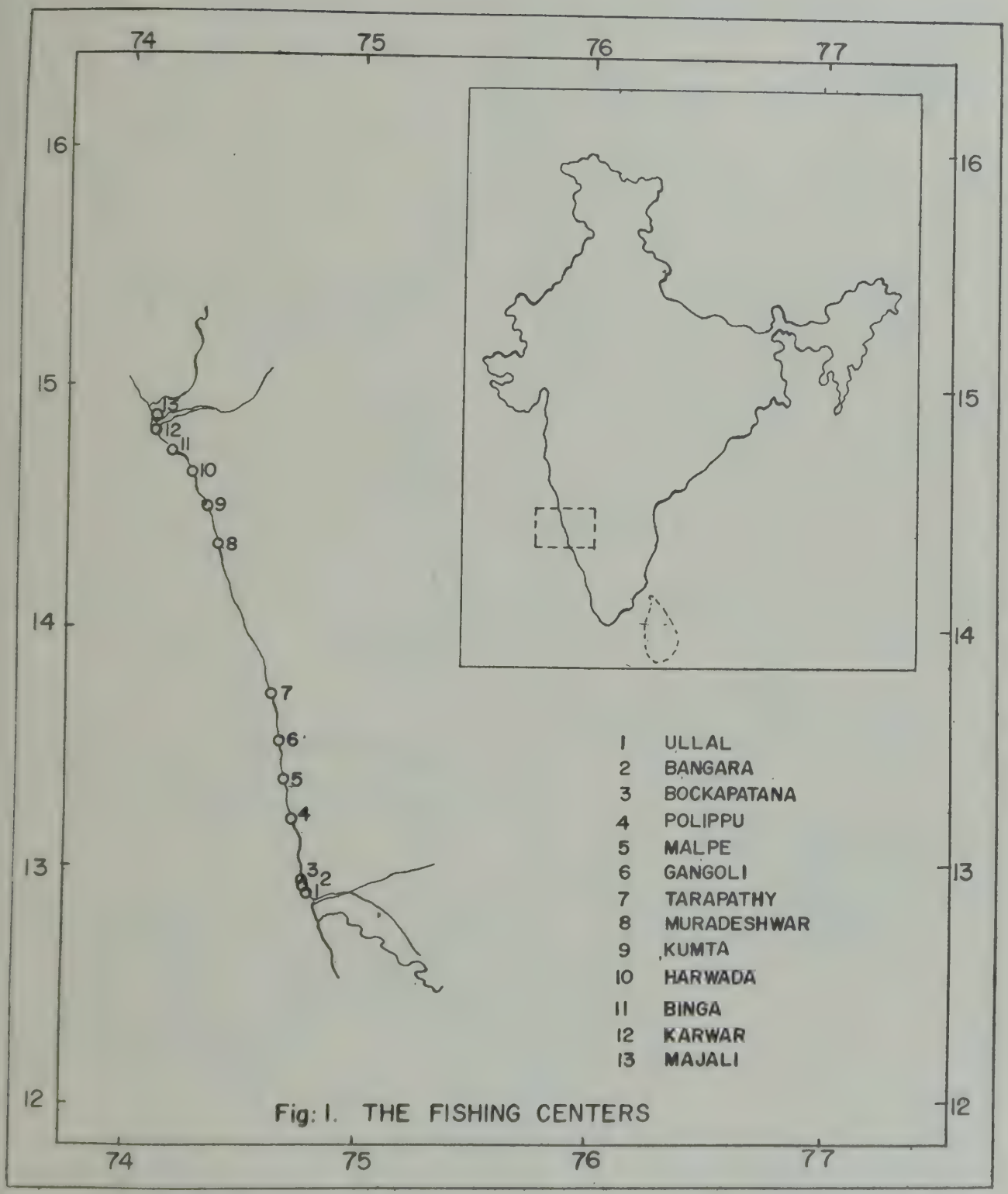


Fig: 1. THE FISHING CENTERS

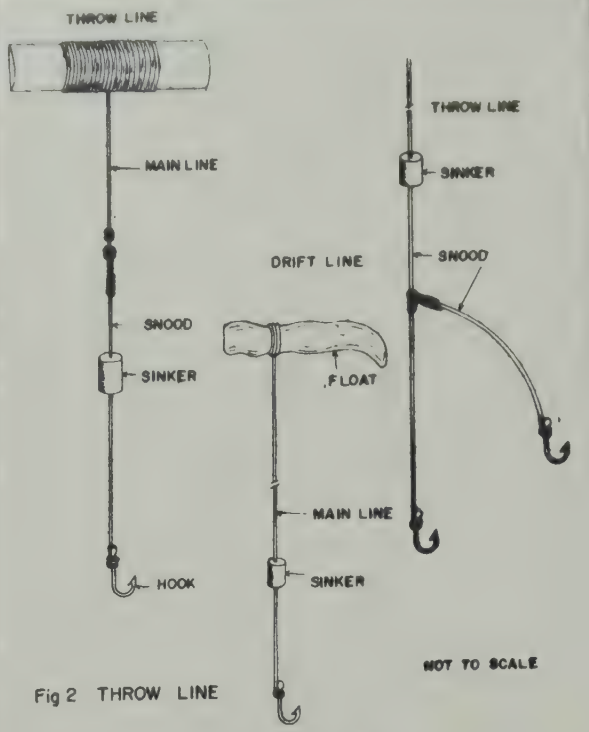


Fig 2 THROW LINE

Fig 3 DRIFT LINE

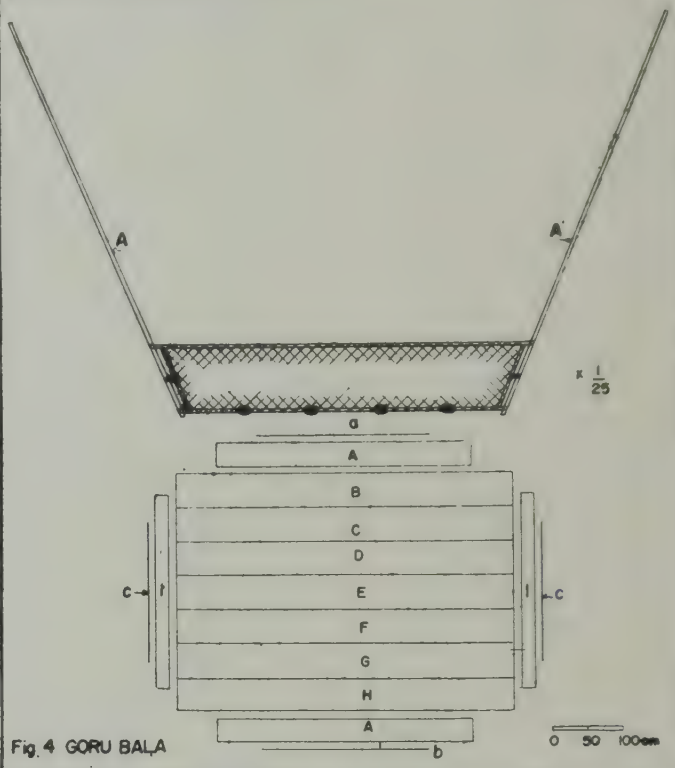


Fig 4 GORU BALA

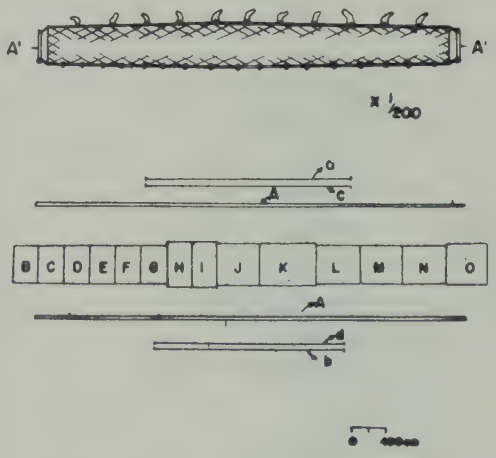


Fig 5 PAYODA

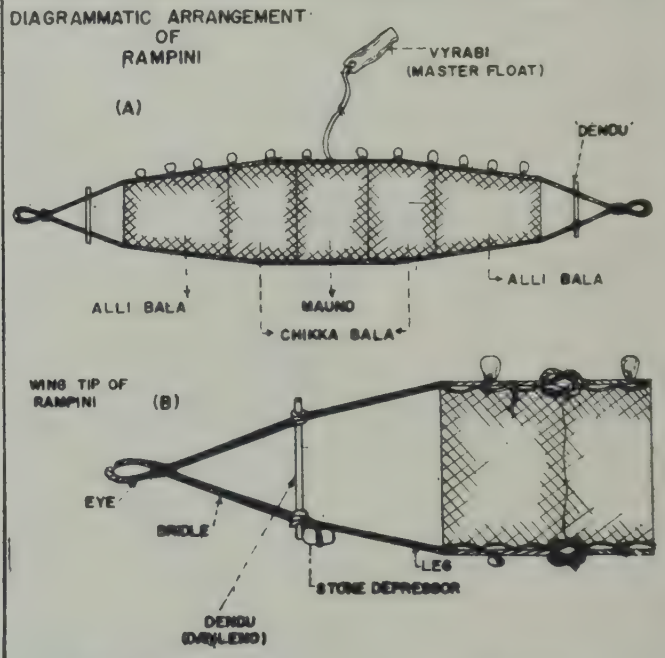


Fig 6 A & B

NOT TO SCALE

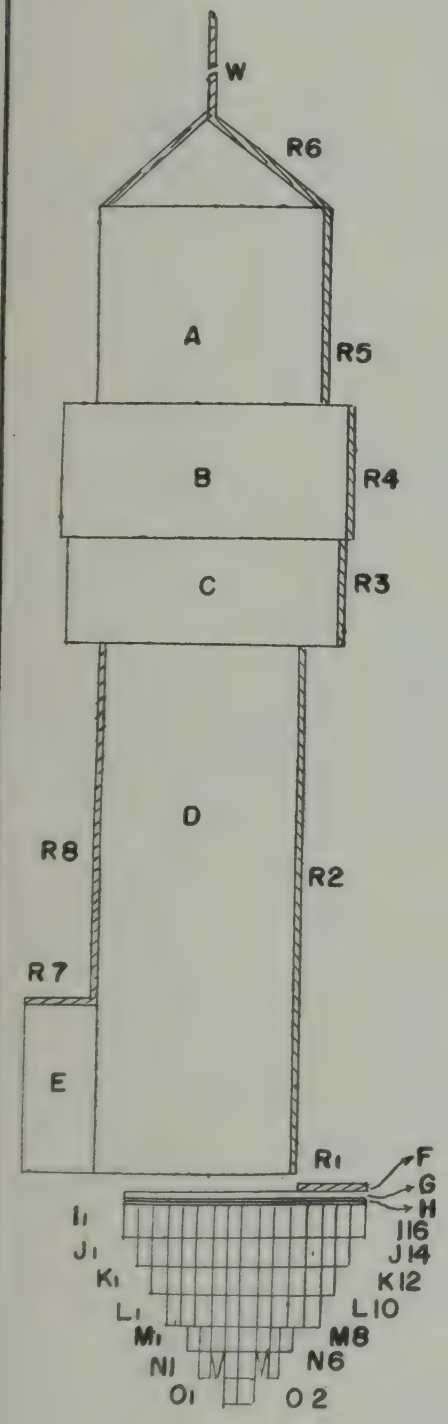


Fig: 7. MARI BALA

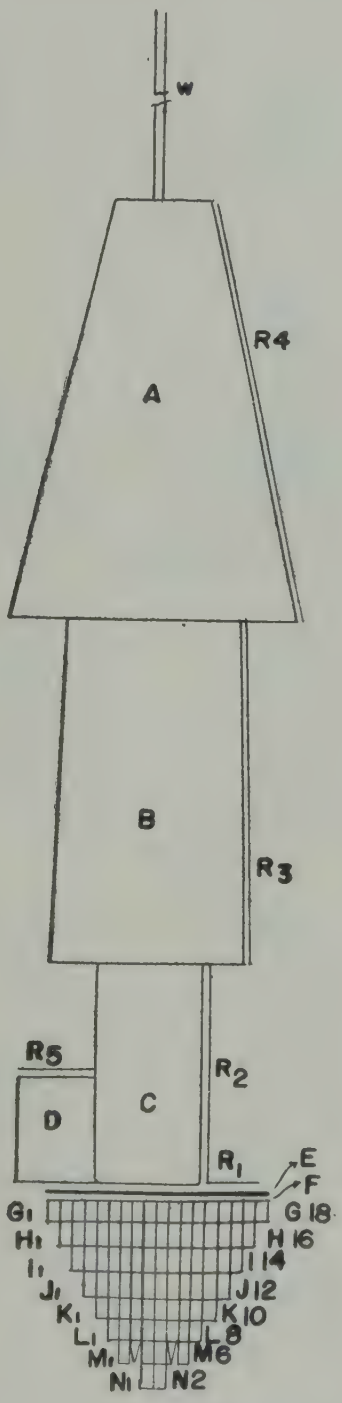


Fig: 8. GOL BALA

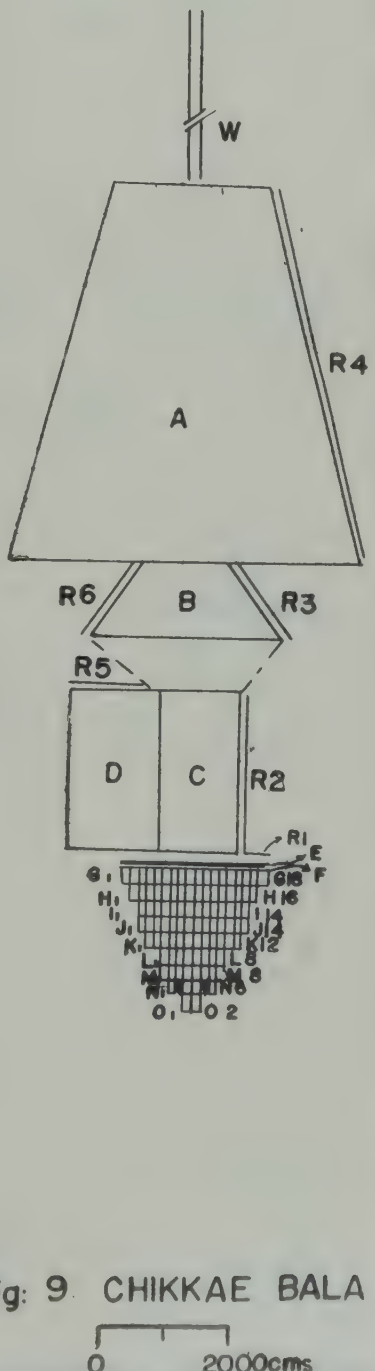
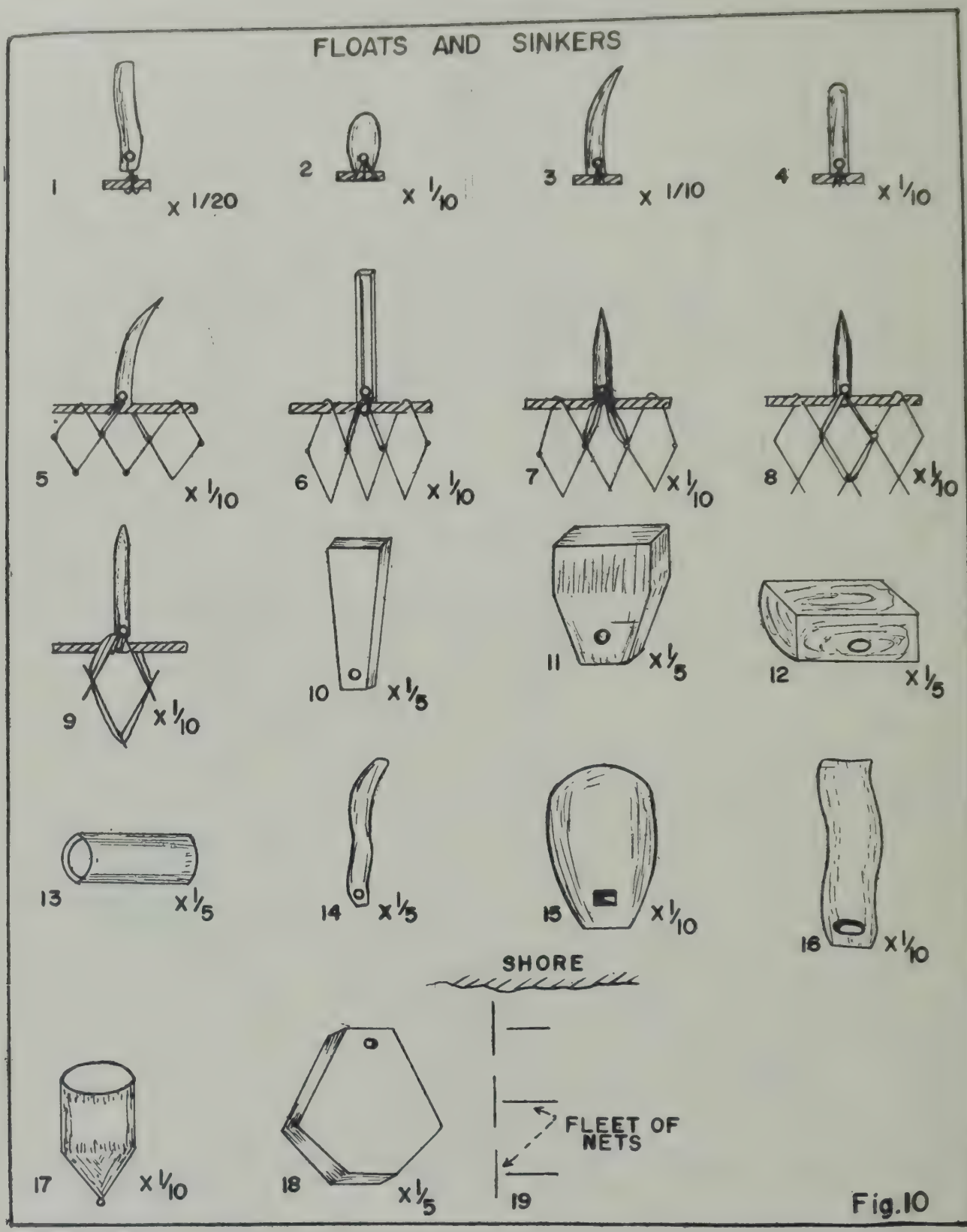


Fig: 9. CHIKKAE BALA

0 2000cms


FLOATS AND SINKERS
1
x 1/20
2
x 1/10
3
x 1/10
4
x 1/10
5
x 1/10
6
x 1/10
7
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x 1/10
16
x 1/10
17
x 1/10
18
x 1/5
SHORE
FLEET OF NETS
19

Fig.10

TABLES

Table - I Centres visited and gear surveyed.

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Table - III General characteristics of drift long lines.

Table - IV General characteristics of double stick net.

Table - V General characteristics of shore seine

Table - VI Details of Kairampini of Bockapatna.

Table - VII Details of Rampini of Binga.

Table - VIII General characteristics of boat seine.

Table - IX Design details of totally encircling net.

Table - X Design details of cast net.

Table - XI Design details of seer drift net.

Table - XII Design details of *Engraulis* drift net.

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Table - XIV Design details of gar fish drift nets.

Table - XV Design details of sardine drift net.

Table - XVI Design details of ray tangle net.

Table - XVII Design details of Kanatha Bala.

Table - XVIII Details of main fishing gear materials.

TABLE - I CENTRES VISITED AND GEAR SURVEYED

Name of Centre	*Name of Station*	*Gear observed*
Mangalore	Ullal	*PATTA BALA, OBALA, PATHERLAE BALA, KANDAI BALA, KANATHA BALA, CHALA BALA, BOLINGER BALA, MANAGU BALA, BEPPU & MARI BALA*
	Bockapatna	*PATTA BALA, MARI BALA, KANDAI BALA & KAIRAMPINI.*
	Bongara	*KANDAI BALA*
Polippu		*MARI BALA* or *VOI BALA, AIBURLA BALA, THORKAE BALA, KANATHA BALA & EDACHI BALA*
Malpe		*PATTA BALA, BALYANA BALA, THORKAE BALA CHATTBAIKA PATTA BALA, KAIRAMPINI & GALA.*
Gangoli		*PATTA BALA, GOLADU BALA, BEEDU BALA, MATU BALA, BEESU BALA & GALA*
Tarapathy		*PATTA BALA, BEEDU BALA, BEESU BALA & RAMPINI*
Muradeswar		*BEEDU BALA*
Kumta		*PATTA BALA, GOL BALA, BEEDU BALA, THORKAE BALA & BEESU BALA.*
Harwada		*PATTA BALA, BEEDU BALA, THORKAE BALA, PAG, GORU BALA, PAYODA* or *ENDI & ULI*
Binga		*GOL BALA, BEEDU BALA & RAMPINI*
Karwar		*GOL BALA, CHIKKAE BALA, PAG, ELU BALA, GORU BALA & GALA*
Majali		*PATTA BALA* or *BANGUDA JAL, BEEDU BALA, MANCHI BALA, BUDI BALA, BUDICHI BALA, WAGALI BALA, PAG, PAYODA & SHENDI BALA*

TABLE - IV GENERAL CHARACTERISTICS OF DOUBLE STICK NET

Sl. No.	*Station*	*Local Name*	*Landing Part Material*	*Mesh bar* (m.m.)	*Coeffi-cient of hanging*	*Hung Depth* (m)	*Head Rope Length* (m)	*Foot Rope Length* (m)	*No. of men*
1	Harwada	*GORU BALA*	Cotton 40|4|1	3.8	0.53	1.47	2.57	2.48	2

Sl. No.	*Season*	*Fishes caught*
1	Round the year	Miscellaneous variety of small fishes

TABLE - VI DETAILS OF KAIRAMPINI OF BOCKAPATNA
OUTER WING : ALLI BALA

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (m m)	No of meshes in Length	No of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging: Head rope	Coefficient of Hanging: Foot rope	Floats No.	Sinkers No.
1	Cotton	20|8|1	22.56	300	125	3.90	3.85	0.28	0.31	4	7
2	Cotton	20|4|1	17.78	300	114	3.80	4.33	0.35	0.40	4	9
3	Cotton	20|4|1	19.05	300	119	4.72	4.69	0.41	0.35	5	9
4	Cotton	20|4|1	17.78	300	157	3.09	3.19	0.29	0.43	3	6
5	Cotton	20|4|1	16.51	300	146	3.87	3.77	0.64	0.43	6	10
6	Cotton	20|4|1	15.20	300	144	3.80	3.75	0.41	0.45	4	5
7	Cotton	20|4|1	16.51	300	126	4.57	4.46	0.46	0.41	5	7
8	Cotton	20|4|1	13.97	300	180	3.59	3.65	0.43	0.43	5	7
9	Cotton	20|4|1	16.51	300	132	4.41	4.26	0.44	0.30	5	7
10	Cotton	20|6|1	15.24	300	157	3.65	3.24	0.40	0.41	5	5
11	Cotton	20|6|1	17.78	300	140	4.06	4.33	0.38	0.40	3	9
12	Cotton	20|6|1	16.51	300	175	3.49	3.14	0.35	0.28	5	8

TABLE - VI (Contd.) INNER WING: THIKKABALA

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (m m)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging: Head rope	Coefficient of Hanging: Foot rope	Floats No.	Sinkers No.
1	Cotton	20|7|1	8.89	400	332	3.29	2.84	0.46	0.40	5	12
2	Cotton	20|7|1	8.89	400	362	3.09	3.04	0.43	0.42	9	12
3	Cotton	20|7|1	8.89	400	362	2.58	2.20	0.36	0.31	6	10
4	Cotton	20|7|1	8.89	400	362	2.94	2.86	0.41	0.40	8	11
5	Cotton	20|7|1	8.89	400	362	3.19	2.50	0.45	0.35	8	13
6	Cotton	20|7|1	8.89	380	362	2.68	2.20	0.40	0.32	7	10
7	Cotton	20|7|1	8.89	400	362	2.99	2.65	0.42	0.37	6	10
8	Cotton	20|7|1	8.89	400	362	3.19	2.60	0.45	0.37	8	10
9	Cotton	20|7|1	8.89	400	362	2.68	2.53	0.37	0.35	7	11

TABLE - VI (Contd.) LANDING PART : MAUND

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (m m)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging Head rope	Coefficient of Hanging Foot rope	Floats No.	Sinkers No.
1	Cotton	20|7|1	10.1	200	354	1.62	1.48	0.40	0.36	4	4
2	Cotton	20|7|1	10.1	200	354	1.46	1.33	0.36	0.33	4	3
3	Cotton	20|7|1	10.1	400	354	3.21	3.11	0.39	0.38	6	10
4	Cotton	20|7|1	10.1	400	354	3.54	3.36	0.43	0.42	7	13
5	Cotton	20|7|1	10.1	300	354	2.84	2.25	0.60	0.37	5	10
6	Cotton	20|7|1	10.1	400	354	3.51	3.39	0.43	0.41	7	11
7	Cotton	20|7|1	10.1	400	354	2.96	2.81	0.36	0.25	6	10
8	Cotton	20|7|1	10.1	200	354	1.77	1.62	0.43	0.40	5	6
9	Cotton	20|7|1	10.1	200	342	1.72	1.67	0.42	0.41	6	7
10	Cotton	20|7|1	10.1	400	337	3.26	2.89	0.40	0.35	7	12

TABLE - VII DETAILS OF RAMPINI OF BINGA — OUTER WING: ALLI BALA

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (m m)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging Head rope	Coefficient of Hanging Foot rope	Floats No.	Sinkers No.
1	Hemp	2|1	15.24	300	137	6.45	6.24	0.79	0.68	5	2
2	Hemp	2|1	22.86	300	147	5.99	5.96	0.43	0.43	4	3
2	Hemp	2|1	21.59	300	152	5.43	5.33	0.42	0.41	4	2
4	Hemp	2|1	22.86	300	140	5.63	5.63	0.41	0.41	4	3
5	Hemp	2|1	22.86	300	156	4.72	4.82	0.34	0.35	4	3
6	Hemp	2|1	22.86	300	150	5.58	5.33	0.40	0.38	4	2
7	Hemp	2|1	20.32	300	168	5.89	5.53	0.48	0.45	4	3
8	Hemp	2|1	22.86	300	152	6.60	6.55	0.48	0.47	4	3
9	Hemp	2|1	21.59	300	170	6.04	5.79	0.57	0.43	4	3
10	Hemp	2|1	22.86	300	150	5.94	5.79	0.43	0.42	4	3
11	Hemp	2|1	22.86	300	152	5.68	5.63	0.41	0.41	4	3
12	Hemp	2|1	22.86	300	154	5.99	5.94	0.43	0.43	4	3

TABLE - VII (Contd.) OUTER WING : ALLI BALA

Sl. No. of panel	WEBBING Material	Speci-fication	Mesh bar (mm)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging Head rope	Coefficient of Hanging Foot rope	Floats No.	Sinkers No.
13	Hemp	2|1	22.86	300	160	6.29	6.29	0.46	0.46	4	3
14	Cotton	20|3|3	21.59	300	164	5.73	5.68	0.44	0.44	4	3
15	Cotton	20|3|3	21.59	300	173	5.79	5.73	0.44	0.44	4	3
16	Cotton	20|3|3	21.59	300	174	5.68	5.48	0.44	0.42	4	2
17	Cotton	20|3|3	21.59	300	165	5.73	5.63	0.44	0.43	4	2
18	Cotton	20|3|3	21.59	300	173	5.73	5.68	0.44	0.44	4	2
19	Cotton	20|3|3	22.86	300	164	5.79	5.73	0.42	0.41	4	2
20	Cotton	20|3|3	21.59	300	170	5.84	5.79	0.45	0.44	4	3
21	Cotton	20|3|3	21.59	300	169	5.79	5.79	0.44	0.44	4	3
22	Cotton	20|3|3	22.86	300	172	5.99	5.89	0.43	0.43	4	3
23	Cotton	20|3|3	21.59	300	189	5.79	5.73	0.44	0.44	4	3
24	Cotton	20|3|3	22.86	300	166	5.73	5.84	0.41	0.42	4	3
25	Cotton	20|3|3	22.86	300	159	5.79	5.60	0.42	0.41	4	3
26	Cotton	20|3|3	22.86	300	176	5.70	5.60	0.42	0.41	4	3
27	Cotton	20|3|3	21.59	300	186	5.70	5.63	0.44	0.43	4	3
28	Cotton	20|3|3	22.86	300	170	5.79	5.79	0.42	0.42	4	3
29	Cotton	20|3|3	22.86	300	155	5.84	5.79	0.42	0.42	4	3
30	Cotton	20|3|3	22.86	300	174	5.73	5.63	0.41	0.41	4	3
31	Cotton	20|3|3	22.86	300	166	5.73	5.70	0.41	0.41	4	3
32	Cotton	20|3|3	22.86	300	165	5.94	5.89	0.43	0.43	4	3
33	Cotton	20|3|3	22.86	300	170	5.73	5.73	0.41	0.42	4	3
34	Cotton	20|3|3	24.13	300	167	5.89	5.79	0.41	0.40	4	3
35	Cotton	20|3|3	22.86	300	191	5.79	5.79	0.42	0.42	4	3
36	Cotton	20|3|3	21.59	300	177	5.81	5.63	0.45	0.43	4	3
37	Cotton	20|3|3	22.86	300	157	5.79	5.79	0.42	0.42	4	3
38	Cotton	20|3|3	21.59	300	164	5.79	5.63	0.44	0.43	4	3
39	Cotton	20|3|3	22.86	300	159	5.73	5.79	0.41	0.42	4	3
40	Cotton	20|3|3	20.32	300	156	5.84	5.84	0.48	0.48	4	3
41	Cotton	20|3|3	22.86	300	163	5.38	5.35	0.39	0.39	4	3
42	Cotton	20|3|3	22.86	300	161	5.53	5.43	0.40	0.39	4	3
43	Cotton	20|3|3	22.86	300	159	5.35	5.30	0.39	0.39	4	3

TABLE - VII (Contd.) OUTER WING : ALLI BALA

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (m m)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging Head rope	Coefficient of Hanging Foot rope	Floats No.	Sinkers No.
44	Cotton	20|3|3	22.86	300	166	5.40	5.38	0.39	0.39	4	3
45	Cotton	20|3|3	22.86	300	156	5.18	5.18	0.37	0.37	4	3
46	Cotton	20|3|3	22.86	300	162	5.43	5.38	0.39	0.39	4	3
47	Cotton	20|3|3	22.86	300	169	5.18	4.87	0.37	0.35	4	3
48	Cotton	20|3|3	22.86	300	166	4.41	4.41	0.32	0.32	4	3
49	Cotton	20|3|3	22.86	300	162	5.07	5.09	0.37	0.37	4	3
50	Cotton	20|3|3	22.86	300	162	4.97	4.82	0.36	0.35	3	3
51	Cotton	20|3|3	22.86	300	166	4.62	4.43	0.33	0.32	3	3
52	Cotton	20|3|3	22.86	300	171	5.18	5.12	0.37	0.37	3	3
53	Cotton	20|3|3	22.86	300	170	4.82	4.94	0.35	0.36	3	3
54	Cotton	20|3|3	21.59	300	168	5.02	5.04	0.39	0.39	3	3
55	Cotton	20|3|3	20.32	300	168	5.43	5.18	0.44	0.42	4	3
56	Cotton	20|3|3	22.86	300	165	5.58	5.25	0.40	0.38	4	3
57	Cotton	20|3|3	22.86	300	167	5.86	5.86	0.42	0.42	4	3
58	Cotton	20|3|3	21.59	300	178	5.79	6.01	0.44	0.46	4	3
59	Cotton	20|3|3	22.86	300	173	5.91	5.73	0.43	0.41	4	3
60	Cotton	20|3|3	22.86	300	165	5.84	5.79	0.42	0.42	4	3
61	Hemp	2|1	22.86	300	161	5.33	5.18	0.38	0.37	4	3
62	Hemp	2|1	22.86	300	172	5.25	5.23	0.38	0.38	4	3
63	Hemp	2|1	22.86	300	154	6.34	6.24	0.46	0.45	4	3
64	Hemp	2|1	24.13	300	160	5.86	5.89	0.40	0.40	4	3
65	Hemp	2|1	22.86	300	181	5.02	4.92	0.36	0.35	4	3
66	Hemp	2|1	22.86	300	171	6.09	5.94	0.44	0.43	4	3
67	Hemp	2|1	22.86	300	167	6.40	6.31	0.46	0.46	4	3
68	Hemp	2|1	22.86	300	172	7.11	6.14	0.51	0.44	4	3
69	Hemp	2|1	24.13	300	165	6.29	6.34	0.43	0.43	4	3
70	Hemp	2|1	26.67	300	155	6.19	6.14	0.38	0.38	4	3
71	Hemp	2|1	22.86	300	179	5.89	6.21	0.43	0.45	4	3
72	Hemp	2|1	25.40	300	157	5.99	5.96	0.39	0.39	4	3
73	Hemp	2|1	22.86	300	178	6.09	5.79	0.44	0.42	4	3
74	Hemp	2|1	21.59	300	158	5.12	5.04	0.39	0.39	4	3

TABLE - VII (Contd.) OUTER WING : ALLI BALA

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (m m)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging Head rope	Coefficient of Hanging Foot rope	Floats No.	Sinkers No.
75	Hemp	2|1	22.86	300	179	5.99	5.99	0.43	0.43	4	3
76	Hemp	2|1	24.13	300	158	6.34	6.31	0.43	0.43	4	3
77	Hemp	2|1	21.59	300	161	5.38	5.33	0.41	0.41	4	3
78	Hemp	2|1	24.13	300	162	5.43	5.40	0.37	0.37	4	3
79	Cotton	20|4|3	24.13	300	167	5.91	5.73	0.40	0.39	4	3
80	Cotton	20|4|3	24.13	300	175	5.89	5.79	0.40	0.40	4	3
81	Cotton	20|4|3	20.32	300	177	5.91	5.79	0.48	0.47	4	3
82	Cotton	20|4|3	22.86	300	172	5.84	5.79	0.42	0.42	4	3
83	Cotton	20|3|3	21.59	300	163	5.48	5.25	0.42	0.40	4	3
84	Cotton	20|3|3	21.59	300	168	5.33	5.20	0.41	0.40	4	3
85	Cotton	20|3|3	21.59	300	170	5.04	5.02	0.39	0.38	4	3
86	Cotton	20|3|3	21.59	300	170	4.87	4.97	0.37	0.38	4	3
87	Cotton	20|3|3	21.59	300	168	5.07	4.99	0.39	0.38	4	3
88	Cotton	20|3|3	21.59	300	167	4.67	4.43	0.36	0.34	4	3
89	Cotton	20|3|3	22.86	300	161	4.94	4.92	0.36	0.36	4	3
90	Cotton	20|3|3	24.13	300	163	5.04	4.94	0.35	0.34	4	3
91	Cotton	20|3|3	21.59	300	166	4.43	4.33	0.34	0.33	4	3
92	Cotton	20|3|3	21.59	300	169	5.33	4.92	0.41	0.38	4	3
93	Cotton	20|3|3	21.59	300	159	5.48	5.33	0.43	0.41	4	3
94	Cotton	20|3|3	21.59	300	157	5.23	5.18	0.40	0.40	4	3
95	Cotton	20|3|3	21.59	300	159	5.45	5.35	0.42	0.41	4	3
96	Cotton	20|3|3	21.59	300	166	5.40	5.14	0.41	0.39	4	3
97	Cotton	20|3|3	21.59	300	160	5.55	5.18	0.43	0.40	4	3
98	Cotton	20|3|3	22.86	300	163	5.40	5.30	0.39	0.38	4	3
99	Cotton	20|3|3	20.32	300	180	5.84	5.73	0.48	0.47	4	3
100	Cotton	20|3|3	21.59	300	170	5.73	5.73	0.42	0.42	4	3
101	Cotton	20|3|3	21.59	300	168	5.79	5.60	0.44	0.43	4	3
102	Cotton	20|3|3	24.13	300	161	5.73	5.70	0.39	0.39	4	3
103	Cotton	20|3|3	21.59	300	174	5.79	5.65	0.44	0.43	4	3
104	Hemp	2|1	25.40	300	154	6.52	6.40	0.42	0.42	4	3
105	Hemp	2|1	24.13	300	168	7.26	7.08	0.50	0.48	4	3
106	Hemp	2|1	24.13	300	170	7.18	7.01	0.49	0.48	4	3

TABLE - VII (Contd.) OUTER WING : ALLI BALA

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (m m)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging Head rope	Coefficient of Hanging Foot rope	Floats No.	Sinkers No.
107	Hemp	2|1	24.13	300	172	6.21	6.14	0.43	0.42	4	3
108	Hemp	2|1	24.13	300	178	6.70	6.55	0.46	0.45	4	3
109	Hemp	2|1	24.13	300	165	6.40	6.14	0.44	0.42	4	3
110	Hemp	2|1	24.13	300	168	7.31	7.13	0.50	0.49	4	3
111	Hemp	2|1	26.67	300	158	6.40	6.34	0.40	0.39	4	3
112	Hemp	2|1	26.67	300	156	6.34	6.24	0.40	0.39	4	3
113	Hemp	2|1	27.94	300	143	6.40	6.24	0.38	0.37	4	3
114	Hemp	2|1	21.59	300	179	6.47	6.29	0.50	0.48	4	3
115	Hemp	2|1	21.59	300	173	7.31	7.23	0.56	0.48	4	3
116	Hemp	2|1	22.86	300	168	7.28	7.16	0.53	0.52	4	3
117	Hemp	2|1	22.86	300	168	6.60	6.40	0.48	0.46	4	3
118	Hemp	2|1	24.13	300	161	5.89	5.63	0.40	0.38	4	3
119	Hemp	2|1	24.13	300	172	6.26	5.99	0.43	0.41	4	3
120	Hemp	2|1	24.13	300	172	5.38	5.02	0.37	0.34	4	3
121	Hemp	2|1	21.59	300	178	6.75	6.55	0.52	0.50	4	3
122	Hemp	2 1	21.59	300	185	6.40	6.24	0.49	0.48	4	3
123	Hemp	2|1	26.67	300	165	7.48	7.11	0.46	0.44	4	3
124	Hemp	2|1	22.86	300	178	6.14	5.94	0.44	0.43	4	3
125	Hemp	2,1	25.40	300	155	6.14	5.94	0.40	0.39	4	3
126	Hemp	2|1	25.40	300	158	6.39	6.14	0.41	0.40	4	3
127	Hemp	2|1	22.86	300	165	5.48	5.18	0.40	0.37	4	3
128	Hemp	2,1	22.86	300	167	6.16	6.19	0.44	0.45	4	3
129	Hemp	2|1	24.13	300	167	6.24	5.99	0.43	0.41	4	3
130	Hemp	2,1	24.13	300	168	6.40	6.29	0.44	0.43	4	3
131	Hemp	2|1	24.13	300	171	5.48	5.38	0.37	0.37	4	3
132	Hemp	2|1	24.13	300	187	5.89	5.94	0.40	0.41	4	3
133	Hemp	2|1	24.13	300	178	5.99	5.79	0.41	0.40	4	3
134	Hemp	2|1	24.13	300	170	5.81	5.48	0.40	0.37	4	3
135	Hemp	2|1	24.13	300	170	6.70	6.65	0.46	0.45	4	3
136	Hemp	2|1	24.13	300	173	6.09	5.94	0.42	0.41	4	3
137	Hemp	2|1	24.13	300	167	7.01	6.95	0.48	0.48	4	3
138	Hemp	2|1	24.13	300	174	5.70	5.48	0.39	0.37	4	3

TABLE - VII (Contd.) OUTER WING : ALLI BALA

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (m m)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging Head rope	Coefficient of Hanging Foot rope	Floats No.	Sinkers No.
139	Hemp	2|1	24.13	300	177	6.97	6.40	0.46	0.44	4	3
140	Hemp	2|1	24.13	300	176	7.01	7.01	0.48	0.48	4	3
141	Hemp	2|1	24.13	300	184	7.01	7.01	0.48	0.41	4	3
142	Hemp	2|1	24.13	300	177	6.11	5.94	0.42	0.34	4	3
143	Hemp	2|1	25.40	300	180	5.81	5.79	0.38	0.37	4	3
144	Hemp	2|1	24.13	300	183	5.65	5.40	0.39	0.41	4	3
145	Hemp	2|1	22.86	300	176	5.84	5.65	0.42	0.45	4	3
146	Hemp	2|1	22.86	300	177	6.34	6.24	0.46	0.48	4	3
147	Hemp	2|1	24.13	300	193	7.01	7.01	0.48	0.44	4	3
148	Hemp	2|1	22.86	300	204	6.45	6.19	0.47	0.43	4	3
149	Hemp	2|1	22.86	300	185	6.19	6.01	0.44	0.46	4	3
150	Hemp	2|1	24.13	300	188	7.03	6.70	0.48	0.43	4	3
151	Hemp	2|1	24.13	300	192	6.45	6.95	0.44	0.46	4	3
152	Hemp	2|1	25.40	300	175	7.23	7.06	0.47	0.42	4	3
153	Hemp	2|1	25.40	300	174	6.65	6.45	0.43	0.42	4	3
154	Hemp	2|1	25.40	300	186	6.60	6.40	0.43	0.44	4	3
155	Hemp	2|1	24.13	300	191	6.65	6.40	0.45	0.42	4	3
156	Hemp	2|1	24.13	300	207	6.19	6.16	0.42	0.47	4	3
157	Hemp	2|1	24.13	300	193	6.90	6.85	0.47	0.47	4	3
158	Hemp	2|1	24.13	300	189	6.09	5.79	0.42	0.40	4	3
159	Hemp	2|1	22.86	300	198	6.45	6.09	0.47	0.46	4	3
160	Hemp	2|1	24.13	300	186	6.14	6.09	0.42	0.42	4	3
161	Hemp	2|1	25.40	300	170	6.70	6.65	0.44	0.43	4	3
162	Hemp	2|1	24.13	300	186	6.90	6.45	0.47	0.44	4	3
163	Hemp	2|1	22.86	300	182	6.50	6.14	0.47	0.44	4	3
164	Hemp	2|1	24.13	300	191	7.01	6.75	0.48	0.46	4	3
165	Hemp	2|1	24.13	300	187	6.19	5.96	0.42	0.41	4	3
166	Hemp	2|1	25.40	300	195	6.80	6.55	0.44	0.43	4	3
167	Hemp	2|1	24.13	300	201	5.33	4.92	0.36	0.34	4	3
168	Hemp	2|1	25.40	300	181	6.60	6.34	0.43	0.41	4	3
169	Hemp	2|1	25.40	300	183	6.60	6.45	0.43	0.42	4	3
170	Hemp	2|1	25.40	300	191	6.60	6.45	0.43	0.51	4	3

TABLE - VII (Contd.) OUTER WING : ALLI BALA

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (m m)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging: Head rope	Coefficient of Hanging: Foot rope	Floats No.	Sinkers No.
171	Hemp	2|1	22.86	300	203	7.36	7.08	0.53	0.42	4	3
172	Hemp	2|1	24.13	300	193	6.45	6.09	0.44	0.46	4	3
173	Hemp	2|1	21.59	300	214	6.26	5.96	0.48	0.44	4	3
174	Hemp	2|1	22.86	300	196	6.40	6.09	0.46	0.36	4	3
175	Hemp	2|1	22.86	300	209	5.28	4.94	0.43	0.38	4	3
176	Hemp	2|1	22.86	300	207	6.09	5.94	0.44	0.41	4	3
177	Hemp	2|1	25.40	300	201	6.40	6.29	0.42	0.44	4	3
178	Hemp	2|1	24.13	300	204	6.40	6.40	0.44	0.44	4	3
179	Hemp	2|1	24.13	300	199	6.70	6.36	0.46	0.52	4	3
180	Hemp	2|1	22.86	300	207	7.26	7.16	0.52	0.49	4	3
181	Hemp	2|1	21.59	300	220	6.72	6.34	0.51	0.47	4	3
182	Hemp	2|1	21.59	300	223	6.16	6.19	0.47	0.43	4	3
183	Hemp	2|1	24.13	300	196	6.34	6.39	0.43	0.47	4	3
184	Hemp	2|1	22.86	300	208	6.72	6.45	0.49	0.46	4	3
185	Hemp	2|1	22.86	300	200	6.55	6.40	0.47	0.45	4	3
186	Hemp	2|1	24.13	300	194	6.72	6.55	0.46	0.44	4	3
187	Hemp	2|1	25.40	300	186	6.77	6.75	0.44	0.44	4	3
188	Hemp	2|1	24.13	300	206	6.50	6.09	0.44	0.42	4	3
189	Hemp	2|1	22.86	300	199	6.14	5.94	0.44	0.43	4	3
190	Hemp	2|1	22.86	300	200	6.11	5.99	0.44	0.43	4	3
191	Hemp	2|1	24.13	300	208	5.86	5.60	0.40	0.39	4	3
192	Hemp	2|1	22.86	300	217	5.99	6.01	0.43	0.43	4	3
193	Hemp	2|1	25.40	300	198	6.11	6.04	0.40	0.48	4	3
194	Hemp	2|1	24.13	300	209	5.89	5.73	0.40	0.48	4	3
195	Hemp	2|1	24.13	300	196	6.04	5.91	0.41	0.40	4	3
196	Hemp	2|1	22.86	300	216	6.55	6.40	0.47	0.46	4	3
197	Hemp	2|1	22.86	300	219	6.19	6.01	0.45	0.43	4	3
198	Hemp	2|1	25.40	300	198	5.99	5.73	0.39	0.37	4	3
199	Hemp	2|1	22.86	300	209	6.24	6.21	0.45	0.45	4	3
200	Hemp	2|1	24.13	300	198	6.24	6.04	0.43	0.41	4	3
201	Hemp	2|1	25.40	300	195	6.47	6.42	0.42	0.42	4	3
202	Hemp	2|1	24.13	300	213	6.50	6.42	0.44	0.44	4	3

TABLE - VII (Contd.) OUTER WING : ALLI BALA

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (mm)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging Head rope	Coefficient of Hanging Foot rope	Floats No.	Sinkers No.
203	Hemp	2|1	24.13	300	206	6.16	6.09	0.42	0.42	4	3
204	Hemp	2|1	24.13	300	218	6.26	6.24	0.43	0.43	4	3
205	Hemp	2|1	24.13	300	219	6.24	6.09	0.43	0.42	4	3
206	Hemp	2|1	24.13	300	215	6.26	6.09	0.43	0.42	4	3
207	Hemp	2|1	22.86	300	224	6.19	5.89	0.45	0.43	4	3
208	Hemp	2|1	22.86	300	220	6.29	6.21	0.45	0.45	4	3
209	Hemp	2|1	22.86	300	210	6.19	6.09	0.45	0.44	4	3
210	Hemp	2|1	22.86	300	212	6.14	5.94	0.44	0.42	4	3
211	Hemp	2|1	24.13	300	206	7.01	6.92	0.48	0.47	4	3
212	Hemp	2|1	25.40	300	189	6.80	6.47	0.43	0.42	4	3
213	Hemp	2|1	25.40	300	200	6.42	6.29	0.42	0.41	4	3
214	Hemp	2|1	25.40	300	200	6.50	7.06	0.42	0.46	4	3
215	Hemp	2|1	22.86	300	233	6.60	6.40	0.48	0.46	4	3
216	Hemp	2|1	24.13	300	209	7.06	7.01	0.48	0.48	4	3
217	Hemp	2|1	24.13	300	204	6.45	6.09	0.44	0.42	4	3
218	Hemp	2|1	24.13	300	212	6.42	5.99	0.42	0.41	4	3
219	Hemp	2|1	22.86	300	221	7.08	7.06	0.51	0.51	4	3
220	Hemp	2|1	25.40	300	207	7.16	7.11	0.47	0.46	4	3
221	Hemp	2|1	24.13	300	228	7.08	7.01	0.48	0.48	4	3
222	Hemp	2|1	22.86	300	225	6.90	6.80	0.50	0.49	4	3
223	Hemp	2|1	22.86	300	215	6.45	6.40	0.47	0.46	4	3
224	Hemp	2|1	25.40	300	206	6.34	6.29	0.41	0.41	4	3
225	Hemp	2|1	24.13	300	226	4.97	4.82	0.34	0.33	4	3
226	Hemp	2|1	24.13	300	238	4.67	4.53	0.32	0.31	4	3
227	Hemp	2|1	25.40	300	220	6.09	5.94	0.40	0.39	4	3
228	Hemp	2|1	24.13	300	209	5.28	5.02	0.36	0.34	4	3
229	Hemp	2|1	24.13	300	217	5.25	5.12	0.36	0.35	4	3
230	Hemp	2|1	24.13	300	213	6.29	6.09	0.43	0.42	4	3
231	Hemp	2|1	24.13	300	212	6.26	5.86	0.43	0.40	4	3
232	Hemp	2|1	24.13	300	234	5.53	5.25	0.38	0.36	4	3
233	Hemp	2|1	22.86	300	227	5.50	5.43	0.40	0.39	4	3
234	Hemp	2|1	24.13	300	227	5.58	5.43	0.38	0.37	4	3

TABLE - VII (Contd.) OUTER WING : ALLI BALA

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (m m)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging Head rope	Coefficient of Hanging Foot rope	Floats No.	Sinkers No.
235	Hemp	2|1	22.86	300	219	6.11	5.96	0.44	0.43	4	3
236	Hemp	2|1	22.86	300	222	6.31	6.24	0.46	0.45	4	3
237	Hemp	2|1	25.40	300	209	6.36	6.24	0.41	0.41	4	3
238	Hemp	2|1	24.13	300	212	5.91	5.48	0.40	0.37	4	3
239	Hemp	2|1	24.13	300	218	5.58	5.33	0.38	0.36	4	3
240	Hemp	2|1	24.13	300	223	5.12	4.82	0.35	0.33	4	3
241	Hemp	2|1	24.13	300	226	5.58	5.40	0.38	0.37	4	3
242	Hemp	2|1	24.13	300	227	5.20	4.97	0.35	0.34	4	3
243	Hemp	2|1	24.13	300	227	6.09	5.89	0.42	0.40	4	3
244	Hemp	2|1	21.59	300	247	5.55	5.30	0.42	0.40	4	3
245	Hemp	2|1	22.86	300	241	5.48	5.33	0.40	0.38	4	3
246	Hemp	2|1	22.86	300	244	6.45	6.09	0.47	0.44	4	3
247	Hemp	2|1	22.86	300	233	6.19	6.01	0.45	0.43	4	3
248	Hemp	2|1	22.86	300	232	6.26	6.16	0.45	0.44	4	3
249	Hemp	2|1	24.13	300	212	6.24	6.09	0.43	0.42	4	3
250	Hemp	2|1	22.86	300	248	6.29	6.19	0.45	0.45	4	3
251	Hemp	2|1	24.13	300	236	6.31	5.96	0.43	0.41	4	3
252	Hemp	2|1	25.40	300	240	6.34	5.96	0.41	0.39	4	3
253	Hemp	2|1	22.86	300	262	6.19	6.09	0.45	0.44	4	3
254	Hemp	2|1	21.59	300	270	6.31	6.31	0.48	0.48	4	3
255	Hemp	2|1	24.13	300	236	6.50	6.45	0.44	0.44	4	3
256	Hemp	2|1	25.40	300	226	6.42	6.19	0.44	0.42	4	3
257	Hemp	2|1	24.13	300	243	6.70	6.60	0.46	0.45	4	3
258	Hemp	2|1	22.86	300	258	7.01	7.01	0.51	0.51	4	3
259	Hemp	2|1	24.13	300	242	6.40	6.09	0.44	0.42	4	3
260	Hemp	2|1	24.13	300	254	6.45	6.21	0.44	0.42	4	3
261	Hemp	2|1	24.13	300	250	6.29	6.24	0.43	0.43	4	3
262	Hemp	2|1	22.86	300	257	6.29	6.29	0.45	0.45	4	3
263	Hemp	2|1	22.86	300	257	6.14	6.01	0.44	0.43	4	3
264	Hemp	2|1	22.86	300	252	6.14	5.99	0.44	0.43	4	3
265	Hemp	2|1	22.86	300	256	6.09	5.79	0.44	0.42	4	3
266	Hemp	2|1	25.40	300	251	5.58	5.23	0.36	0.34	4	3

TABLE - VII (Contd.) OUTER WING : ALLI BALA

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (mm)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging Head rope	Coefficient of Hanging Foot rope	Floats No.	Sinkers No.
267	Hemp	2|1	24.13	300	256	6.11	5.99	0.42	0.41	4	3
268	Hemp	2|1	22.83	300	257	5.48	5.30	0.40	0.40	4	3
269	Hemp	2|1	24.13	300	245	6.40	6.24	0.44	0.43	4	3
270	Hemp	2|1	22.86	300	258	5.53	5.33	0.40	0.38	4	3
271	Hemp	2|1	22.86	300	261	5.18	5.09	0.37	0.37	4	3
272	Hemp	2|1	24.13	300	259	5.68	5.25	0.39	0.36	4	3
273	Hemp	2|1	24.13	300	244	5.18	5.09	0.35	0.35	4	3
274	Hemp	2|1	24.13	300	239	5.28	5.30	0.36	0.36	4	3
275	Hemp	2|1	24.13	300	251	5.48	5.38	0.39	0.37	4	3
276	Hemp	2|1	25.40	300	231	5.18	5.07	0.33	0.33	4	3
277	Hemp	2|1	24.13	300	258	5.30	5.25	0.36	0.36	4	3
278	Hemp	2|1	24.13	300	248	5.48	5.38	0.39	0.37	4	3
279	Hemp	2|1	24.13	300	237	5.50	5.40	0.38	0.37	4	3
280	Hemp	2|1	24.13	300	256	5.55	5.30	0.38	0.36	4	3
281	Hemp	2|1	24.13	300	229	5.79	5.70	0.40	0.40	4	3
282	Hemp	2|1	24.13	300	261	5.68	5.58	0.39	0.36	4	3
283	Hemp	2|1	25.40	300	242	5.91	5.91	0.38	0.38	4	3
284	Hemp	2|1	24.13	300	260	5.94	5.84	0.41	0.40	4	3
285	Hemp	2|1	24.13	300	242	5.91	5.84	0.40	0.40	4	3
286	Hemp	2|1	24.13	300	262	5.68	5.53	0.39	0.38	4	3
287	Hemp	2|1	22.86	300	261	5.81	5.73	0.42	0.40	4	3
288	Hemp	2|1	22.86	300	274	5.73	5.58	0.41	0.40	4	3
289	Hemp	2|1	22.86	300	267	5.84	5.79	0.42	0.42	4	3
290	Hemp	2|1	25.40	300	248	5.99	5.79	0.39	0.38	4	3
291	Hemp	2|1	25.40	300	244	5.96	5.79	0.39	0.38	4	3
292	Hemp	2|1	24.13	300	260	5.79	5.58	0.40	0.38	4	3
293	Hemp	2|1	24.13	300	264	5.79	5.63	0.40	0.38	4	3
294	Hemp	2|1	25.40	300	258	5.79	5.63	0.21	0.20	4	3
295	Hemp	2|1	24.13	300	266	5.73	5.63	0.39	0.38	4	3
296	Hemp	2|1	22.86	300	260	5.68	5.63	0.41	0.41	4	3
297	Hemp	2|1	22.86	300	267	5.79	5.68	0.42	0.41	4	3

TABLE - VII (Contd.) OUTER WING : ALLI BALA

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (m m)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging Head rope	Coefficient of Hanging Foot rope	Floats No.	Sinkers No.
298	Hemp	2|1	24.13	300	274	6.29	5.89	0.43	0.40	4	3
299	Hemp	2|1	22.86	300	275	5.94	5.79	0.43	0.42	4	3
300	Hemp	2|1	22.86	300	296	5.68	5.73	0.41	0.41	4	3
301	Hemp	2|1	24.13	300	286	5.84	5.73	0.40	0.39	4	3
302	Hemp	2|1	24.13	300	274	5.94	5.79	0.41	0.40	4	3
303	Hemp	2|1	22.86	300	299	5.79	5.63	0.42	0.41	4	3
304	Hemp	2|1	22.86	300	302	5.86	5.73	0.42	0.41	4	3
305	Hemp	2|1	24.13	300	295	5.86	5.18	0.40	0.35	4	3
306	Hemp	2|1	24.13	300	280	6.21	5.73	0.42	0.39	4	3
307	Hemp	2|1	24.13	300	280	5.86	5.84	0.40	0.40	4	3
308	Cotton	20|3|3	21.59	300	315	5.12	5.12	0.39	0.39	4	3
309	Cotton	20|3|3	24.13	300	295	5.18	5.02	0.35	0.34	4	3
310	Cotton	20|3|3	24.13	300	302	5.33	5.18	0.36	0.35	4	3
311	Cotton	20|3|3	21.59	300	314	5.18	5.20	0.40	0.40	4	3
312	Cotton	20|3|3	24.13	300	296	5.28	5.04	0.36	0.34	4	3
313	Cotton	20|3|3	20.32	300	325	5.04	4.97	0.41	0.40	4	3

TABLE - VII (Contd.) INNER WING : THIKKA BALA

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (mm)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging Head rope	Coefficient of Hanging Foot rope	Floats No.	Sinkers No.
1	Cotton	20|3|3	15.24	250	553	2.50	2.25	0.32	0.30	3	1
2	Cotton	20|3|3	11.30	250	662	2.63	2.58	0.46	0.45	3	1
3	Cotton	20|3|3	15.24	250	521	2.48	2.30	0.32	0.30	3	1
4	Cotton	20|3|3	12.70	250	608	2.53	2.43	0.40	0.38	3	1
5	Cotton	20|3|3	12.70	250	611	2.53	2.35	0.39	0.37	3	1
6	Cotton	20|3|3	12.70	250	601	2.43	2.43	0.38	0.38	3	1
7	Cotton	20|3|3	13.97	250	552	2.58	2.53	0.37	0.36	3	1
8	Cotton	20|3|3	12.70	250	590	2.48	2.45	0.39	0.38	3	1
9	Cotton	20|3|3	13.97	250	550	2.37	2.43	0.34	0.34	3	1
10	Cotton	20|3|3	11.30	250	654	2.43	2.35	0.42	0.41	3	1
11	Cotton	20|3|3	12.70	250	623	2.48	2.35	0.39	0.37	3	1
12	Cotton	20|3|3	12.70	250	556	2.53	2.43	0.39	0.38	3	1
13	Cotton	20|3|3	14.60	250	556	2.68	2.63	0.36	0.36	3	1
14	Cotton	20|3|3	12.70	250	605	2.32	2.32	0.37	0.37	3	1
15	Cotton	20|3|3	13.97	250	583	2.43	2.35	0.34	0.34	3	1
16	Cotton	20|3|3	12.70	250	655	2.53	2.32	0.40	0.37	3	1
17	Cotton	20|3|3	12.70	250	624	2.48	2.43	0.39	0.38	3	1
18	Cotton	20|3|3	13.91	250	615	2.58	2.32	0.37	0.33	3	1
19	Cotton	20|3|3	12.70	250	619	2.48	2.43	0.39	0.38	3	1
20	Cotton	20|3|3	15.24	250	546	2.43	2.35	0.31	0.31	3	1
21	Cotton	20|3|3	12.70	250	653	2.43	2.30	0.38	0.36	3	1
22	Cotton	20|3|3	12.70	250	590	2.58	2.48	0.40	0.39	3	1
23	Cotton	20|3|3	12.70	250	605	2.50	2.35	0.39	0.37	3	1
24	Cotton	20|3|3	12.70	250	593	2.50	2.32	0.39	0.37	3	1
25	Cotton	20|3|3	12.70	250	626	2.53	2.30	0.40	0.36	3	1
26	Cotton	20|3|3	12.70	250	635	2.50	2.45	0.39	0.38	3	1
27	Cotton	20|3|3	12.70	250	600	2.58	2.48	0.40	0.39	3	1
28	Cotton	20|3|3	12.70	250	557	2.58	2.43	0.40	0.34	3	1
29	Cotton	20|3|3	12.70	250	632	2.55	2.43	0.40	0.38	3	1
30	Cotton	20|3|3	12.70	250	711	2.50	2.43	0.40	0.38	3	1

TABLE - VII (Contd.) LANDING PART : MAUND

Sl. No. of panel	WEBBING Material	Specification	Mesh bar (mm)	No. of meshes in Length	No. of meshes in Depth	Head Rope Length (m)	Foot Rope Length (m)	Coefficient of Hanging Head rope	Coefficient of Hanging Foot rope	Floats No.	Sinkers No.
1	Cotton	20|5|3	13.97	150	589	1.18	1.11	0.28	0.26	1	1
2	Cotton	20|5|3	13.97	150	599	1.18	1.13	0.28	0.27	1	Nil
3	Cotton	20|5|3	13.97	150	630	1.11	1.06	0.26	0.25	1	Nil
4	Cotton	20|5|3	13.97	150	562	1.11	1.06	0.24	0.23	1	Nil
5	Cotton	20|5|3	13.97	150	598	1.08	1.03	0.26	0.25	1	Nil
6	Cotton	20|5|3	13.97	150	606	1.18	1.13	0.31	0.30	1	Nil
7	Cotton	20|5|3	13.97	150	601	1.11	1.01	0.29	0.26	1	Nil
8	Cotton	20|5|3	13.97	150	640	1.13	1.01	0.30	0.28	1	1

TABLE - VIII GENERAL CHARACTERISTICS OF BO

Sl. No.	Station	Local name	BAG No. of circular bands	Material	Speci-fication dia m. m.	Mesh bar m.m.	WING & PLATFOR Material	Mesh bar c.m.	Len head
1	Ullal	*MARI BALA*	7	Hemp	10|1 4|1	2.5 1.2	19.0- 22.5	Coir	21.00- 73.00	129
2	Bockapatna	*MARI BALA*	7	Hemp	8|1 4|1	4.0 2.0	25.4- 27.9	Coir	21.00- 73.00	129
3	Polippu	*MARI BALA* or *VOI BALA*	8	Hemp	10|1 4|1	3.0 1.5	19.1- 25.4	Coir	20.32- 49.53	166
4	Gangoli	*GOLADU BALA* *GOL BALA*	6	Hemp	9|1 4|1	3.0 2.0	22.8- 29.2	Coir	20.00- 72.00	162
5	Kumta	or *MARI BALA*	8	Hemp	12|1 6|1	2.5 2.0	17.8- 19.05	Coir	21.59- 72.12	145
6	Binga	*GOL BALA*	8	Hemp	7|1 4|1	3.0 2.0	19.05	Coir	20.00- 68.00	138
7	Karwar	*GOL BALA*	9	Hemp	9|1 4|1	3.0 2.0	16.5- 19.05	Coir	160.16	160

Sl No.	CRAFT Type	L.O.A. m.	No. of crew	No.of boat	Pilot boat	Depth of ground m.	Season	Fishes caught
1	Dug out	11.00	8	2	Present	9-15	September to February	Cat fish
2	—do—	10.72	8	2	—do—	10-15	November to February	—do—
3	—do—	10.80	8	2	—do—	14-16	November to February	—do—
4	—do—	10.70	8	2	—do—	10-15	August to December September to November	Cat fish Jew fish
5	—do—	11.10	7	2	—do—	12-17	August to November	—do—
6	—do—	10.80	7	2	—do—	14-16	August to November	—do—
7	—do—	9.80	7	2	—do—	10-17	September to November	—do—

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